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Relation-specific investments in business relationships – scale development and validation

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Abstract

Relation-specific investment in business relationships is not a new, but still a core concept of several research and academic publications. Globalization, intense competition, short product life cycles are only a view phenomenon of today's turbulent economy that lead to more intense collaboration between cooperating partners necessitating such relation-specific investments. In this working paper we basically aim at measuring these relation-specific investments. But in order to be able to measure them, first we have to conceptualize it, develop a scale and also test and validate it.

Keywords: supply chain relationship, relation-specific investments, ARA model, scale development, validity analysis

Kapcsolat-specifikus beruházások üzleti kapcsolatokban – mérési skála fejlesztése és validálása

Absztrakt

Az üzleti kapcsolatokban felhalmozott kapcsolat-specifikus befektetés vizsgálata nem új keletű, de mind a mai napig fontos koncepciót jelent az üzleti kapcsolatok tanulmányozását végző kutatók számára. Globalizálódó környezetünkben, a verseny erősödése és az egyes termékek rövidülő életciklusa mellett egyre gyakoribb, hogy az együttműködő partnerek komoly befektetéseket végeznek üzleti partnereikkel fenntartott kapcsolataikban. Műhelytanulmányunk célja, hogy mérhetővé tegye ezeket a befektetéseket. Ennek érdekében azonban elsőként konceptualizálni kell azokat, ki kell dolgozni egy mérésére alkalmas skálát, majd tesztelni is szükséges azt. Erre vállalkozik műhelytanulmányunk, mely ezt a folyamatot lépésenként mutatja be.

Kulcsszavak: ellátási lánc kapcsolatok, kapcsolat-specifikus befektetések, ARA modell, skála fejlesztése, skála validálása

Introduction

Relation-specific investment in business relationships is not a new, but still a core concept of several research and academic publications (Dwyer, 1987; Bensaou, 1999; Yu et al., 2006). Globalization, intense competition, short product life cycles are only a view phenomenon of today's turbulent economy that lead to more intense collaboration between cooperating partners necessitating such relation-specific investments. In this working paper we basically aim at measuring these relation-specific investments. But in order to be able to measure them, first we have to conceptualize it, develop a scale and also test and validate it. Only after this development and testing phase can the scale be used in further empirical analysis. In the following we step by step present the applied process for scale development and validation.

Conceptualizing relation-specific investments

It is clear that relation-specific investments are the relation-specific costs of ongoing and long-standing relationships generated and accumulated in these relationships, but they are very diverse and difficult to measure. They can include assets dedicated to the relationship by both of the cooperating parties (e.g., a warehouse established for JIT servicing of the buyer's production process) or human resources (e.g., an engineer employed by the buyer who is sent to the supplier to troubleshoot the latter's problems). These investments support different activities occurring between the counterparts (e.g., coordinating transactions or joint problem solving), are present in resources devoted to and used in the relationship and usually lead to more robust social bonds (e.g., trust and commitment) between the two parties. Based on extensive qualitative research, Håkansson and Johanson (1992) developed the AAR model, in which they identified three different building blocks of any business relationships: Actor bonds, Activity links and Resource ties.

Actor bonds evolve among employees of the cooperating firms. The strength of these bonds depends on the extent to which cooperating employees trust each other and are satisfied with each other's work as well as on the level of mutual commitment. Developing trust and increasing satisfaction and mutual commitment generate relation-specific investments over time (Duffy and Fearne, 2002; Yu et al., 2006). *Activity links* include different types of processes performed within the relationship. Negotiations, information exchange and joint problem solving and adaptation are specific forms of such activities. These activities

inevitably generate relation-specific investments. The more intense, collaborative and integrated these activities are, the stronger the activity links will be and, at the same time, the more relation-specific investments are needed and generated within the relationship (Batonda and Perry, 2003). *Resource ties* also must be developed in all kinds of business relationships. Matching these supplementary resources requires adaptation from both parties and generates investments in the relationship (Ford et al., 2003).

The development of actor bonds, activity links and resource ties goes hand in hand. The stronger the actor bonds, resource ties and activity links are in a relationship, the more relation-specific investment is generated in that relationship. The overall level of relation-specific investment in a given relationship is consequently determined by the sum of relation-specific investments generated by the three AAR constructs over time. Otto and Obermaier (2009) also argue that this AAR model is appropriate for capturing the investments generated and accumulated in business relationships. We agree with this approach and think that the AAR model is conceptually appropriate for measuring the level of relation-specific investments accumulated in business relationships.

Developing the scale

Still, actor bonds, activities and resources are manifold and extensive; they have not yet been mapped comprehensively, and it may not be feasible to do so. A holistic approach to the problem is necessary to try to map these links and ties as comprehensively as possible.

Our basic research objective was to investigate the development pattern of relation-specific investments along the life cycle of relationships. Consequently we needed to conceptualize, capture and also measure these investments. Based on literature review, we developed a scale that captures and measures relation-specific investments generated over time in a fairly comprehensive way. In this scale, we specified different items within the three constructs of the AAR model (actor bonds, activity links and resource ties) that may be concrete sources of relation-specific investments during a relationship's life cycle.

The first construct of the AAR model is ***actor bond***, which was captured and measured by the levels of *commitment*, *satisfaction* and *trust* between the cooperating parties plus the *strength of personal contacts* in the relationship (Wilson and Jantrania, 1995; Wilkinson and Young, 1994). See question A27 in Appendix 1 for the list of questions used in our questionnaire. The

stronger these concrete actor bonds are, the more relation-specific investment is generated in the relationship. The ***activity link*** construct was captured by a key activity occurring in business relationships, namely, information sharing. We mapped *7 specific information sharing activity types*: sharing information or data related to everyday operations; sharing actual inventory data; sharing data related to planning everyday operations; sharing actual cost and other financial data; sharing information about actual performance measures; sharing information concerning incremental innovation in the relationship; and sharing information concerning radical innovation in the relationship. See question A25 in Appendix 1. The activity information sharing and its 7 concrete forms were chosen because we sought an activity type that is present throughout the whole life cycle of a supply chain relationship and that has a direct and important effect on the success, and consequently on the development potential, of that relationship (Mitchel, 1973; Dyer et al.,1998). Again, the more intense the level of these information sharing activities are, the more relation-specific investment is generated in the relationship. The third construct, ***resource ties,*** was captured by 4 typical resource types: *facilities, tools/devices, methods/procedures* and *human resources*. See question A24 in Appendix 1. These concrete resource types have been widely used in previous research mapping and analyzing different forms of relation-specific investments between cooperating parties in a supply chain partnership (Dyer et al., 1998; Bensaou, 1999).

Validating the scale

The scale developed and presented above included 4 items on the actor bond construct, 4 items on the resource tie construct and 7 on the activity link construct. **We performed substantive validity testing to validate our scale.** The substantive validity of a measure can be defined as the extent to which that measure is judged to be reflective of, or theoretically linked to, the construct intended by the researchers (Holden and Jackson, 1979). Our substantive validity test was performed using the methodology developed by Anderson and Gerbing (1991). One of the strengths of this methodology lies in the fact that a small sample is sufficient for validation (Anderson and Garbing, 1991). Another reason for applying this method is that it is accepted and has already been used for analyzing business relationships (Anderson et al., 1994).

A detailed description and the results of the substantive validity test for our scale can be seen in Appendix 2. Results of our test indicated a substantial overlap between the intended

interpretation of the different items in our scale and the interpretation by the respondents. C_{sv} values showed medium and high correlations, indicating acceptable substantive validity of our scale.

To analyze the stochastic relations among our variables used for capturing relation-specific investments generated by the three building blocks of a business relationship, we calculated the Cronbach's alpha values. For the actor bond construct (measured with 4 questions), the value of Cronbach's alpha was 0.777, that for the activity link construct (measured with 7 questions) was 0.872. The last building block of a relationship – according to the AAR model – is the set of resource ties. Here, we used 4 questions in our scale and calculated a Cronbach's alpha value of 0.775.

Measuring relation-specific investments

After a successful validation we have actually measured these relation-specific investments in concrete business relationships of supply chains active in Hungary. The empirical research performed was based on a questionnaire developed to capture the overall level of relation-specific investments accumulated in a relationship. This overall level of relation-specific investment is called ***explicit investment measure of business relationships***. It was measured by the sum of relation-specific investments generated by the three different relational ties of the AAR model. See section 2 and Appendix 1.

The sample for analysis was gathered using a web-based questionnaire. We sent the questionnaire via e-mail to 170 firms. The sample contains data from about 72 companies; however, the questions related to our focal research question—the strength of different relational ties and consequently the level of relation-specific investments generated by them—were answered by only 46 respondents. The relatively small sample size is, due to the fact that our questions asked respondents to evaluate an ongoing, concrete and important buyer relationship—a sensitive topic for any supplier company. The effective rate of return was 26%.

Sample size is always a critical issue in applied statistical analysis, especially but not exclusively in social sciences, where gathering data is usually much more difficult than it is in natural sciences (Fayers and Machin, 1995; Bissonette, 1999; Boyer, 2000; Gunasekaram et

al., 2004). Still, it is acceptable to perform statistical analyses on small samples (Mitschele, 1991; Gunasekaram et al., 2004). Our sample size can be considered small, although small sample size is not defined exactly in the literature. Bock and Sergeant (2002) for example considers a sample as small that has fewer than 30 observations; this minimum level is exceeded in our analysis.

Although relation-specific investment is conceptually a clear construct and is definitely present in any business relationship, measuring it is a real challenge, mainly because current accounting systems are not prepared for their accurate and credible registration. ***Subjective estimates*** by firms' professionals are a prevalent and accepted way of measuring these investments (Nielson, 1996; Dyer et al. 1998). We asked our respondents to evaluate the respective levels and intensities of different relational ties using a 5-point Likert scale; the more intense and stronger these relational ties are perceived to be, the more relation-specific investments are needed to develop and maintain them. ***Respondents*** were logistics and supply chain managers of companies that acted as suppliers in the analyzed relationships. We asked these respondents to think of *one specific, ongoing and important business relationship with a prominent* buyer and to evaluate this relationship along the different relational ties.

The overall level of relation-specific investment accumulated in a relationship is a dyadic phenomenon; relation-specific investments of both cooperating parties have a contribution to it. Measuring such *dyadic constructs* is not without methodological problems. In a survey such as ours the possibility of evaluating a relationship attribute by both counterparts is not feasible. Therefore methodology of measuring such dyadic constructs still accepts *single-end research* (Brennan et al., 2003), that is measuring the perceptions of only one party when the perceptions related to the different sides of the same phenomenon do not differ substantially. So we have asked our respondents in supplier position to evaluate the perceived strength of different relational ties and so the level of necessary investments to develop them from the perspective of both cooperating parties, the supplier and the customer. Then *we measured the correlation between the two perceptions, the perceived level of relation-specific investments generated by the supplier and the buyer.* We got medium and high level correlations along all the specific variables used that allow us to use the single-end solution for our subsequent analysis: *The strength of relational ties—and consequently the level of needed relation-specific investments—generated by the supplier and perceived by our respondents was used as proxy for the overall level of relation-specific investment accumulated in the relationship.*

APPENDIX 1: QUESTIONS USED IN THE ONLINE QUESTIONNAIRE DEVELOPED FOR MEASURING RELATIONSHIP HEAVINESS

A24. Please indicate the level of investments generated in the relationship with your key buyer for each of the following resource types (1 = very low level; 3 = medium level, 5 = very high level).

Resource ties	*Level of investments*				
Human resources	1	2	3	4	5
Special tools and devices	1	2	3	4	5
Dedicated methods and procedures	1	2	3	4	5
Facilities	1	2	3	4	5

A25. Please indicate the intensity of information sharing activity between your company and your outstanding buyer for each of the following activity types (1 = very low intensity; 3 = medium intensity, 5 = very high intensity).

	Intensity of information sharing				
Sharing information or data related to everyday operations	1	2	3	4	5
Sharing actual inventory data	1	2	3	4	5
Sharing data related to planning everyday operations	1	2	3	4	5
Sharing actual cost and other financial data	1	2	3	4	5
Sharing information about actual performance measures	1	2	3	4	5
Sharing information concerning incremental innovation	1	2	3	4	5
Sharing information concerning radical innovation	1	2	3	4	5

A27. Please indicate the level of the following actor bonds between your firm and your key buyer (1 = very low level; 3 = medium level, 5 = very high level).

Level of commitment	1	2	3	4	5
Level of satisfaction	1	2	3	4	5
Level of trust	1	2	3	4	5
Strength of personal contacts	1	2	3	4	5

APPENDIX 2: RESULTS OF THE SUBSTANTIVE VALIDITY TEST

The first step of the substantive validity test was an item sort task: 19 professionals active in logistics and supply chain management who were taking a postgraduate course were asked to fill out our written questionnaire and assign specific items of our scale to possible theoretical constructs. (See the questionnaire used for substantive validity testing below.) The respondents were asked to allocate these items to one of the three AAR constructs (activity link, actor bonds or resource ties) to which they felt the given item was most strongly related. The respondents could also choose not to allocate a given item to any of the constructs proposed, indicating that the given item is not appropriate for measuring any of our constructs.

This method develops and uses two types of indices for measuring substantive validity. The first index is the *proportion of substantive agreement*, P_{sa}, which is interpreted as the "proportion of respondents who assign an item to its intended construct" (Anderson and Garbing, 1991, p. 734).

$$P_{sa} = \frac{n_c}{N},$$

where n_c represents the number of people assigning an item to its posited construct, and N represents the total number of respondents. The range of values for P_{sa} is between 0.0 and 1.0, with larger values indicating greater substantive validity of the item.

The second index is called the *substantive-validity coefficient*, C_{sv}, and represents the extent to which respondents assign an item to its posited construct more than to any other construct.

$$C_{sv} = \frac{n_c - n_0}{N},$$

where n_c and N are defined as above, and n_0 indicates the highest number of assignments of a given item to any other construct. The values for this latter index range from -1.0 to 1.0, with larger values indicating greater substantial validity.

After the respondents had completed our questionnaire and assigned the items to the respective constructs they thought to be most appropriate, we calculated the two indices introduced above. The results of our substantive validity test are summarized in table A2.1 below.

These results are positive and support the application of our scale for further analysis. In total, 13 items of the 15 used for capturing the different sources of relation-specific investments generated by the 3 constructs of the AAR model had appropriate P_{sa} and C_{sv} values. The results show a high level of P_{sa} values, indicating a substantial overlap between the interpretations of different items given by the respondents and by the researchers. C_{sv} values indicated medium and high correlations, indicating acceptable substantive validity of our scale. A significant difference between the interpretations given by our respondents and the intended interpretations was detected in only three cases. Item 3 (human resources), item 11 (level of commitment) and item 12 (methods/procedures) were interpreted differently than intended.

Let us recall here the aim of our research, that is, to test relationship heaviness empirically, interpreted as the sum of all relation-specific investments accumulated in the relationship, and its development pattern over time. The AAR model and its three constructs, just like the specific items developed and linked to these constructs, were chosen to identify different potentially relevant and important sources of these investments and to make their measurement possible. These constructs, and consequently the items attached to them, are interrelated. Because of this strong interrelatedness, a lower P_{sa} and C_{sv} value does not make our scale unusable. It only indicates that the source of a given relation-specific investment is thought to be related to a construct other than the one that the researchers and developers of the scale assigned it originally. For our further analysis, the overall level of relation-specific investments has real importance. Numerous responses to our substantive validity testing indicated that no allocation of a given item to any of our constructs would be highly problematic. This result would call into question the applicability of our scale and the AAR model. Of the 285 item allocations (19 respondents multiplied by 15 items) in the substantive validity test, we obtained only 4 such allocations.

Table A2.1 – Empirical results of the substantive validity test of the scale developed for capturing heaviness in a relationship

Indices ***Items***	***Proportion of substantive agreement*** ***(P_{sa})***	***Substantive-validity coefficient*** ***(C_{sv})***
1	0.789474	0.684211
2	0.631579	0.421053
3	0.368421	-0.21053
4	0.684211	0.473684
5	1	1
6	0.842105	0.684211
7	0.684211	0.526316
8	0.842105	0.842105
9	0.947368	0.894737
10	0.631579	0.421053
11	0.526316	0.157895
12	0.105263	-0.57895
13	0.842105	0.736842
14	0.789474	0.684211
15	0.789474	0.684211

Modeling business relationships - Questionnaire for a substantive validity test

Please read our instructions and the interpretations of the three constructs in the left column of table A2.2. below (constructs I., II. and III.). Then, please read the different items in the third column of the table. Do these items represent relevant elements of the constructs discussed? Which of the three constructs do you think a given item belongs to? Please indicate in column two the number of the construct (I. activity link; II. resource ties and III. actor bonds) to which you think a given item can principally be linked. If you think a given item cannot be linked to any construct, please indicate 0. Link an item to at most one construct.

Table A2.2 – Questionnaire used for substantive validity testing

Construct	***Please indicate the number of the construct (0, I., II., III.) to which you think a given item belongs.***	***Items***
I. Activity links: Activities that are performed by cooperating parties in a supply chain relationship to link their own activities and that have a significant role in realizing benefits expected from the relationship.		1. Facilities created to back smooth operation among the cooperating parties of the relationship.
		2. Sharing information or data related to everyday operations.
		3. Human resources applied in the relationship.
		4. Information sharing concerning incremental innovation.
		5. Strength of personal contacts between the two parties.
		6. Special tools and devices used in the relationship.
II. Resource ties: Resources created and used in a supply chain relationship by the cooperating parties to harmonize joint operations and realize expected benefits.		7. Sharing actual cost and other financial data.
		8. Sharing data related to planning everyday operations.
		9. Level of trust developed between the two cooperating companies.
		10. Sharing information about the actual performance measures.
		11. Level of commitment between the cooperating firms.
III. Actor bonds: Personal contacts and their relevant characteristics developed by the counterparts in a given business relationship.		12. Dedicated methods and procedures developed and applied in the given relationship.
		13. Level of satisfaction between the two cooperating parties.
		14. Sharing information concerning radical innovation.
		15. Sharing actual inventory data between the two firms.

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